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ABSTRACT

The guide provides strategies for regular teachers to use with visually impaired (VI) students in the province of Alberta, Canada. After an introduction, definitions of terms such as "adventitiously blind" are presented. Next addressed are effects of visual impairment on cognitive development, emotional and social aspects, and orientation and mobility. Considered, then, are such aspects of planning and classroom management as safety (including fire drills), the buddy system, course scheduling, ways to obtain and store special materials and equipment, seating of the VI student, orientation of regular students, use of the VI student as a resource, and the VI student's responsibilities. Suggestions are given for meeting educational needs of the VI preschool, Braille-using, and partially sighted student in such areas as visual efficiency, skill development, use of media and aids (e.g., diagrams), physical education, and fine arts. Suggested are approaches to assessment and evaluation including techniques teachers may use to equalize opportunity for VI students taking tests or examinations. Appendixes include a list of seven useful terms, a discussion on Braille, descriptions of special materials and equipment, photographs showing ways VI students see, and a list containing 48 references organized into areas for six categories of users including educators and parents. (MC)

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the visually impaired student in the regular classroom

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A. INTRODUCTION

Visual impairments range along a continuum from fairly useful sight to total blindness. The implications for the education of visually impaired children will vary with the degree of visual loss and child's ability to function with his handicap.

This Special Education Handbook section and the Curriculum Guide for the Visually Impaired are concerned with the education of children who have vision rather than perceptual problems. However, a child with a pathological visual disorder may also have perceptual difficulties. In this situation a reading and/or learning disabilities consultant should assist in assessment and program development.

Teachers may have some anxiety when first given the responsibility of a visually impaired student in class. However, many regular class teachers have enjoyed the challenge and have felt that the modifications to teaching strategies necessary to meet the needs of a visually impaired student frequently proved beneficial to all students.

Attending a school in the community enables the visually impaired student to develop in the home environment where there is support from family and friends. Services are available to students, parents and teachers to provide assistance in meeting the student's special needs. Teachers are advised to consult itinerant teachers or Alberta Education Consultants for the Visually Impaired. Early Childhood Services Consultants are also available to assist with programs for visually impaired preschool children.

The regular teacher whose class includes a visually impaired student is <u>not</u> expected to know braille or to operate the special equipment required by the student. However, it is valuable for the teacher to have a basic understanding of the equipment and the braille system. A section on braille and a list of special materials and equipment are therefore included in the appendix.

The teacher should expect the same <u>quality</u> of thought and work from the visually impaired student as is expected of his classmates. The visually impaired student should progress through the regular curriculum according to ability, special skills and application of those skills. However, allowances should be made for the effects of the impairment, e.g. a reduction in the amount of reading to compensate for slower reading rates.

The teacher's acceptance of the visually impaired student as a normal child, with the same potential to learn and to accept responsibility as his peers, will have a considerable effect upon his acceptance by other students.

B. DEFINITIONS

1. <u>Visually Impaired</u>: This term is used to describe all students whose lack of vision or restricted vision interferes with their ability to learn unless special provisions are made.

2. Blind/Braille-Using: Educationally, a child is considered to be blind and a braille-user if, after all possible visual correction, the student must depend for learning upon senses other than vision. All students in this group are legally blind.

3. Partially Sighted/Print-Using: Educationally, a child is considered to be partially sighted if, after all possible visual correction, the student requires special materials and services, but uses visual media including print in learning.

   NOTE: The more severely visually impaired students in this group are also legally blind. After correction they will continue to have severely restricted visual fields and/or visual acuities, in the better eye, of 6/60 metric or 20/200 English or less.

4. Congenitally Blind: Born without sight.

5. Adventitiously Blind: Loss of vision occurring at any age due to accident or illness.

C. EFFECTS OF VISUAL IMPAIRMENT

1. Cognitive Development

A visually impaired child must rely upon any residual vision and other senses for information about the world. The knowledge gained from these senses is often incomplete and imperfect. Touch is only useful for those objects with which one can have direct contact. Hearing is only useful for gathering information about those things which emit some sound. Smell and taste yield less useful information. To complicate matters further, information which is gathered through these senses, cannot be confirmed by vision.

a. Congenitally blind children experience life differently than their sighted peers. Vision invites exploration and facilitates learning by imitation. Congenitally blind children, who lack this motivation, must be encouraged to reach out and to move about so they may explore and extend their environment. Direct intervention from infancy is essential (see Special Education Handbook section, "Preschool Programs for the Special Needs Child").

   Some concepts are very difficult for the congenitally blind child to acquire. It is difficult to imagine such a child's concept of an apartment building. Even to acquire a concept of "room" poses problems, e.g. the child must be made aware of a ceiling deliberately through direct contact with it. Unless this initial contact is repeated and reinforced he may not arrive at a concept of a room which includes a ceiling for quite some time.

The child's concepts of intangibles such as "cloud" and "red" are often formed from "chance" experience and from "snatches" of conversation. While riding on an airplane, he may hear someone say that the clouds are causing bumpiness. He may be told that blood is red or that he looks nice in his red jacket. Some confusion is bound to occur and these "sketchy" concepts will require extension through instruction.

People involved with the congenitally blind child will have to motivate, encourage and assist the child to be curious to explore. They should help him to use his hands effectively in exploration. They will have to explain and converse with him about even the simplest of events as they are taking place. Teachers and parents should use imagery which will be meaningful to the child. In describing objects and events, such imagery should relate to the child's existing senses; for example, objects should be described by texture, shape and function rather than in visual terms, and sounds and smells in the environment should be indicated and identified. Later, as the child's knowledge and understanding increase, he will begin to incorporate some of the vicariously experienced concepts into his language. He will learn to say that the grass is green and that stars twinkle just as a sighted child talks about the atom or outer space.

b. Adventitiously blind children may retain sufficient visual memory to profit from descriptions of a visual nature. These children frequently appear to be in advance of their congenitally blind peers. Even when they retain no visual memory, they still retain the advantage of their previous visual learning, which motivated them to move about, explore, and interact with their environment. They are often more active, curious and better coordinated than congenitally blind children.

c. Partially sighted children may encompass a wide range of visual conditions and acuities (see Appendix D - Implications of Different Visual Conditions). Some will have conditions which are relatively stable while others will fluctuate in their ability to use their vision. Some may be able to perform one type of visual task and not another. Visual functioning must be considered on an individual basis. Much useful information can be gathered regarding the child's visual functioning or visual efficiency by informal observation and by experimenting with different classroom locations for various tasks.

It is important for the teacher to become aware of the implications of the particular child's condition and acuity in order that instructional techniques, equipment and materials are appropriate for the individual student. An itinerant teacher or consultant for the visually impaired may assist the teacher in assessing a student's visual functioning and efficiency.

2. Emotional and Social Aspects

Although blindness is a severe handicap many blind individuals live independent lives and some, through their careers, are internationally recognized. In order to assist and teach a blind student successfully, the teacher must accept him and relegate the handicap to its proper perspective.

Adolescence and puberty can pose special problems for visually impaired students. Social mannerisms, styles and current fashion fads are increasingly important during the adolescent years when peer acceptance is influenced significantly by appearance and behavior. Sighted children gain most of their information and satisfy their curiosity visually during this critical stage of development. In order to assist visually impaired students with these potential problems, sensitive assistance and counselling should be made available in both home and school.

The student who has recently lost his vision should return to the regular class as soon as possible. He has many life adjustments to make; many of these, particularly those that involve the self-concept and social and emotional realms, can be made more easily in a supportive and familiar school environment. Special provision should be made to assist this student when he returns to class.

3. Orientation and Mobility

The teacher should ascertain whether a blind student, who is new to the school, has had the opportunity to tour the classrooms and the other parts of the building he will need to know. Before the student can travel independently he will need to have formed a mental map of the routes he must take. The teacher may have a sighted student accompany the blind student until he knows these routes.

Partially sighted students will also benefit from an opportunity to explore the building and the classroom. As students become familiar with the classroom and school environment they should be able to move freely and confidently from place to place using a variety of orientation and mobility techniques including body protection, wall trailing, cane travel and a sighted guide.

It is recommended that teachers of a blind student develop an awareness of some of the difficulties in navigating about a school building when one is blind. An Orientation and Mobility Instructor can supervise an opportunity for teachers to explore these problems while blind-folded.

D. PLANNING AND CLASSROOM MANAGEMENT

1. Safety Considerations

The regular class teacher must consider the following factors to ensure that the visually impaired student is safe in the environment:

a. Fire drills and field trips. It is essential that the teacher assign a buddy to assist the visually impaired student whenever there is urgency in moving from place to place or when travelling in unfamiliar locations.

b. Obstacles. Consideration should be given to minimizing the number of obstacles left lying on the floor. Workmen's tool kits and materials, and students' books and personal belongings, when left in hallways or aisles, are all potential hazards. If these conditions cannot be eliminated, the visually impaired student should be alerted and assisted in order to avoid accidents. He should also be informed whenever classroom furnishings have been rearranged.

Visually impaired students are no more likely than other students to sustain injuries when participating in activities in the physical education program, the chemistry laboratory, the home economics or industrial education classrooms, if good safety measures are provided for all students. Visually impaired students should be expected to participate in these school programs and will need to be made familiar with work areas and equipment, and the safety procedures that all students must follow. Additional precautions may be necessary if classes are large.

Reference materials and resource people are available to address safety programs or particular problems.

2. Buddy System

A sighted buddy, usually a classmate, can be helpful in assisting a visually impaired student. A buddy can, for example:

a. act as a sighted guide
b. provide a copy of class notes, using pressure sensitized paper
c. locate and/or read brief passages when appropriate
d. interpret visual changes, e.g. in a chemistry experiment.

The use of a buddy system has other incidental values. It increases safety, and it facilitates social interaction between the visually impaired student and his sighted peers. Opportunities for social interaction are increased if several "home room" student volunteers, rather than one student, are selected to act as buddies.

Some caution should be employed in using the buddy system technique. Students who participate should regard this activity as both a privilege and a responsibility. Only reliable students who are willing and able to perform this function should be selected. The involvement of these students should not become so engrossing that their own academic work or social activities suffer. Buddies should also understand that they are assisting the visually impaired student towards independence.

The visually impaired student also must assume some responsibilities in having the buddy system work successfully. He should remember to ask for assistance politely, refuse help graciously when it is not required, show appreciation appropriately, and not be overly assuming or demanding.

3. Course Scheduling

The school counsellor, the itinerant teacher and homeroom teacher should assist each junior high school or high school visually impaired student in planning his school program in the spring for the following school year. When arranging the program, courses should be selected and scheduled to provide:

a. A balance of heavy and light courses in each semester. It would be unwise to include a number of courses requiring considerable reading and writing in one semester as this could overload the student and seriously reduce his opportunity to achieve good grades and to participate in extra-curricular activities;

b. Sufficient spare periods for work and study. Because it takes more time for these students to read and complete work, time available within the school day enables them to reduce the amount of work that must be completed at home;

c. Possible reduction of course load. This student, as others, should be involved in extra-curricular activities. If he appears to be involved only in school work or does not possess good general health it may be necessary to reduce the number of courses. The guidance counsellor, parents and students should all be involved in such a decision. Consideration should be given to programming for four years rather than three;

d. Options or electives and special projects which will be interesting and beneficial for the visually impaired student. These courses should provide an opportunity for students to develop new interests, improve skills which may enhance their academic performance or to pursue activities which are not within the scope of the regular curriculum. For example, if the student could benefit from optacon instruction and skill development, a special project proposal might be put forward in order that he may obtain credits for this learning activity;

e. Text books in the appropriate format. Once a tentative schedule has been set it should be determined whether books in the appropriate format are available from the Materials Resource Centre. If a major text book must be brailled it may be wise to schedule that particular course for the following semester to ensure that the student will have the entire text when it is required.

4. Obtaining Special Materials and Equipment

The Alberta Education Materials Resource Centre (M.R.C.) obtains and produces textbooks in braille, large print, and tape recorded formats. These special materials are then supplied on a long term, free loan basis for students who require them. Special tape recorders, braillers, kits, and small wares such as braille erasers are also available from the centre.

Teachers, in consultation with itinerant teachers for the visually impaired, are responsible for ensuring that necessary textbooks are requested from the M.R.C. Generally, one person within a school coordinates requests, places orders, distributes and returns special materials. An annual computer-produced catalogue of the book collections is available to assist the teacher. Teachers may also inquire about books which are not listed in the M.R.C. catalogue.

Teachers are advised to submit requests for books as early as possible to ensure that they will be available when required by the student. They should provide full ordering information including the edition and the format required. Additional time is required if a book must be produced by hand, or if a search must be made and the book obtained from another library in Canada or the United States.

Braille-using students must have brailled text books in mathematics. They may have to use some tape recorded text books for other courses. Where possible the student should have both the brailled book and a tape recorded book. If a new book is being produced and the teacher intends to use only portions of it, the teacher should write a special note to the M.R.C. The portions first required should be indicated in order that these sections will be brailled first.

5. Storage of Materials and Equipment

Teachers should ensure that adequate and appropriate provision is made for storage space, work space and care of materials and equipment. Accessibility of materials and equipment is important. Classroom shelving used by the student should be in one location, perhaps at the beginning or the end of a row of shelves. Consideration should be given to the size and location of the work spaces, to lighting requirements and access to power outlets. Organization is essential for visually impaired students and should be stressed with them by all of their teachers. Desks should always be tidy and materials should be put away; when not in use, equipment should be covered as a protection against dust. Theft inhibitor cables, when supplied with equipment, should be used.

6. Light Source and Searing Arrangements

The teacher is advised, because of the variety of visual conditions and acuities of partially sighted students, to contact an itinerant teacher or a consultant for the visualiy impaired for an interpretation of the student's eye report and assistance in determining where this student should be placed in the classroom.

The visual condition and acuity of a partially sighted student may necessitate his being seated near the chalkboard. Another student, because of extreme sensitivity to light, may need to sit away from the windows. A student with sight in only one eye should be located so that he can view both front and side board with his good eye.

Partially sighted students should be encouraged to move as necessary to view demonstrations and to determine what is written on the chalkboard. Teachers should remember not to silhouette themselves by standing between the student and the light source since looking into the light causes discomfort and reduces the student's ability to recognize gestures and facial expressions.

7. Orientation of Class

The teacher should prepare the other students in the class to understand and accept a blind or partially sighted student. There are numerous films, books and simulation exercises for students of all ages which would be helpful in providing some background for discussion prior to the arrival of the visually impaired student. Resource people such as the school guidance counsellor, the librarian and the itinerant teacher for the visually impaired could all assist the teacher in this endeavor.

It is helpful if regular students are given the opportunity to voice their questions and concerns. Sometimes regular students, especially adolescents, avoid the visually impaired student merely because they are afraid of saying "the wrong thing". Once these students realize that blind students use expressions such as "did you see ...", and "I'll see you tomorrow", they are relieved from this worry and more likely to seek out and initiate conversation with the visually impaired student.

A sighted student should learn to use the visually impaired student's name prior to conversing with him in order that the visually impaired student will know that someone wishes to talk to him. The regular student should also identify himself to the visually impaired student in group discussions. Use of these simple techniques eases the situation for both students and avoids possible confusion or embarrassment.

The teacher, by providing these opportunities to develop understanding of the visually impaired, will assist sighted students to appreciate and accept the visually impaired student.

8. The Visually Impaired Student as a Resource Person

The teacher can learn much about the effects of the student's handicap and the implications this has for instruction through discussion with the visually impaired student. In this way the teacher may determine whether the partially sighted student's vision is more useful for near or far distance, if he is able to see the board, what length of time he can read comfortably, whether he experiences spelling difficulty and how he has been taking tests.

The teacher can also conduct an informal assessment of the partially sighted student's ability to function visually at far and near distances by having the student list articles on a table, describe the contents of a picture on the wall and read aloud from notes on the chalkboard. Examination of the student's written work will indicate whether lines in note books are useful, whether special paper would be helpful and whether there are letter formation or other writing problems which require remediation. The student's speed of writing should also be considered. The teacher may find this writing speed to be greatly reduced when the student is required to copy information from the chalkboard. Having the student read aloud from a text book will acquaint the teacher with how close to the print the student must work.

9. Student Responsibilities

Visually impaired students in the elementary grades should be expected to perform independently the essential self care tasks which they have mastered.

Teachers should include the visually impaired student when assigning classroom responsibilities for watering plants, tidying shelves, or cleaning brushes as this develops a sense of responsibility in even a very young child. Visually impaired students in the junior and senior high school grades should gradually assume more responsibility for their work, in order that, upon leaving school, they will be prepared and desire to function as independently as possible.

Early in the term, teachers should make certain that the visually impaired student understands what is expected of him in his academic program. Quality of work should be emphasized over quantity in recognition of the student's slower reading speeds. Except in terms of quantity of work, teachers should not have lower expectations for the performance of visually impaired students.

Visually impaired students should generally be submitted to the same rules of conduct and disciplinary measures as other students. However, if an infraction should occur a teacher should first ensure that is did not result because the visually impaired student was disadvantaged due to his impairment.

E. MEETING EDUCATIONAL NEEDS

1. Preschool

The learning experiences which take place in a preschool program are particularly critical to the growth of a visually impaired child. Assistance in applying for special grants and in individualizing and developing programs is available from Alberta Education Early Childhood Services and Special Education Consultants.

2. The Braille-Using Student

The teacher of the regular class is not expected to know braille. Students will submit reports and assignments in typewritten form. However, as the use of braille generally results in slow reading speeds and in spelling and typing problems, it would be helpful to the teachers working with a braille-using student to have an understanding of the braille system. Appendix B provides a description of this system.

3. The Partially Sighted Student

Teachers are advised to contact an itinerant teacher for the visually impaired for guidance in ordering special materials for partially sighted students. The partially sighted student should be encouraged to read regular print if possible. Students may hold standard print close to their eyes to obtain greater magnification. This close reading will not damage the eyes. (It should be noted that primary textbooks are already in fairly large print.) Advantages of using standard print are:

a. greater number of words encompassed in the visual field thus increasing the reading speed
b. greater availability of reading materials
c. standard-size books are easier to handle
d. availability of colored illustrations.

If magnification of print is necessary, teachers are advised to discuss with the itinerant teacher, the appropriateness of devices such as a hand held or stand magnifier or a closed circuit television reader.

Extended periods of reading, although not harmful, are potentially stressful and fatiguing for the partially sighted student. The teacher should watch for indications of tension and provide alternative activities for relief.

4. Visual Efficiency

A student's visualy efficiency can be improved provided that an appropriately sequenced program is administered. It is highly recommended that a program to increase visual efficiency be initiated at an early age and incorporated into the student's program.

A visual efficiency program involves activities which promote:

a. visually related tactile discrimination
b. visual discrimination according to size, color and sequence
c. visual organization of a whole from the parts
d. discrimination among, and recognition of, black outline drawings of animals and household objects
e. ability to see similarities and differences in shapes and the inner details of similar objects
f. recognition of objects in the foreground and in the background
g. discrimination of letters and words.

5. Developing Concepts

a. Need for Concrete Experiences.

Sighted children develop many concepts through incidental learning. Visually impaired children, who frequently have limited experiences, do not have equivalent opportunities for concept development. This development must begin with learning about self and the environment. Many varied, repeated, and reinforced concrete experiences with everyday objects and situations are essential. Models or replicas provide opportunities to explore but the real thing is preferable whenever possible. For example, real fruit should be used instead of plastic fruit. Embossed pictures (raised line illustrations) are considered to be semi-abstract. They may be useful as outline representations or simple figures such as a fork, leaf, or hand, but should never be used to illustrate depth perceptions.

Visually impaired students may have a tendency to use words that they do not understand. These confused speech patterns usually occur when there has been a lack of concrete experiences, a surplus of vicarious or rote learning and an emphasis on visual imagery. Opportunities for direct experience and daily conversational interactions to clarify misconceptions and build meaningful vocabulary will assist the student in overcoming this problem.

b. Need for Unifying Experience.

Visually impaired students are at a serious disadvantage in totally experiencing objects and situations. For the sighted, vision permits a unification of all observations and confirms and organizes impressions received from the other sensory channels. Visually impaired students experience most fully objects which are relatively small in size and near. Large objects, for example, airplanes and apartment buildings, are only partially experienced. Many objects, such as stars, can only be described to these students. Concepts may become fragmented and disassociated. The teacher must provide opportunities for the student to experience situations in their totality and to unify partial experiences into meaningful wholes. Lessons structured to emphasize how things relate to each other are helpful.

c. Need for Learning by Doing.

Because braille-using children are not visually stimulated to imitate the activities of others and rarely initiate activity, they may appear passive. They need to learn the many routines of daily living and to grow towards increasing independence and self responsibility. They will require extra motivation and must be made aware of the reasons for doing activities. All attempts to initiate activities, particularly during younger years, should be encouraged and reinforced.

6. Special Skill Development

a. Student Notes

Visually impaired students should have organized and useful notes for future reference and study. Depending upon the task and situation, various methods are appropriate in the construction of these notes.

(1) A buddy can be assigned to copy notes, using pressure sensitized paper and a convenient three part binder, available from the M.R.C. No additional work is required from the volunteer since the second or copy sheet is simply given to the visually impaired student. Once the visually impaired student has received the copy of the notes, he may read them if he is able to do so or have someone else (the buddy, friend or family member) read them to him directly. The notes may also be read onto cassette tape for future reference. These tapes should then be appropriately labelled and filed by the student.

The teacher should ensure that the visually impaired student is involved in some constructive, topic-related activity while his classmates are copying notes from the chalkboard.

(2) Teacher Notes - The teacher may wish to provide the visually impaired student with a photocopy of his own notes when appropriate.

(3) Spirit Duplicator Copies (ditto sheets) - Ditto sheets are rarely legible for partially sighted students. When possible, either felt pen, primary type or a xerox copy of the original should be used for good black on white contrast. If a blue ditto sheet is absolutely necessary, the best copy should be selected and the student should cover the sheet with a clear yellow plastic page protector (available from M.R.C.), thereby increasing the intensity of the print.

(4) Direct Construction of Own Notes - The visually impaired student should be responsible for developing notes of lectures, discussion and research readings in whatever form is most convenient for his use, e.g. braille, type or felt penned notes. These may be in point form and very brief in comparison to the notes of sighted classmates. However, since most visually impaired students at the senior grade levels will have developed good recall and memory skills, the pertinent points should trigger recall of supportive detail.

(5) Checking Student Notes - It is common practice to include an evaluation of the student's notebook as a part of the ongoing evaluation of student performance. To evaluate a braille notebook the teacher can observe the general neatness and check the book for divisions by subject or unit. If these divisions are not readily apparent then the student should describe and show them. The student should be asked to read aloud the dates of entries to determine the frequency,

and a spot check should be done by opening the book at random two or three times. The teacher can have the student read aloud these brief notes, and ask him to elaborate on certain topics so that the adequacy of the notes may be determined. In this way the teacher can run checks on the student's perceptions, demonstrate interest, reinforce understanding of the value of note taking, assure himself as to the effectiveness of the notes and the student's ability, and determine whether and where the student may require additional assistance.

b. Research Projects

Visually impaired students should employ a variety of techniques, materials and equipment in obtaining information for research projects. Since there may be only a limited number of braille, sound recorded or large print books available on a particular research topic, teachers are advised to offer a choice of topics and recommend alternative sources when necessary. The teacher and student should review titles of available books pertaining to a specific research project cooperatively and list them in order of priority for the student's use. Time extensions or reduced assignments may be required because of slow reading speeds.

The optacon can be helpful to the blind student for independent study. It can be used to locate information from the card catalogue in the library and to read the index, table of contents and short articles in periodicals and books.

c. Handwriting

Braille-using students should be taught to write their names in script so that they can sign documents, cheques, and typewritten letters. Teachers should require that the braille-using student apply his signature to all work submitted in order that the skill may be reinforced. If the signature is incomplete or not very legible, the teacher should discuss this with the resource person so that necessary skill extension or remediation may take place.

In developing handwriting skills for partially sighted students correct letter formation should be reviewed and techniques for young children used (see Communication section of the curriculum guide).

d. Spelling

Partially sighted and braille-using students generally experience difficulty with spelling. This is a result of the use of contractions in braille and because partially sighted students may not see the word spelled correctly frequently enough to establish it firmly in their minds. Teachers in the elementary grades can assist these students to develop correct spelling by ensuring that they can spell the words from basic word lists. In the upper grades, core vocabulary lists of 10 - 20 words should be presented to the student at the beginning of each new unit of study in all subject areas. In

this way visually impaired students will have the opportunity to learn the spelling vocabulary essential to their notes, reports and tests.

NOTE: When using braille words or flash cards with young braille users, trim the top right hand corner of the card so that the child will keep cards right side up.

e. Typewriting

The use of the typewriter for notes, letters and report writing is recommended for all visually impaired students. Visually impaired students should begin an extensive touch typing program as soon as they are able to do so, usually in the latter part of grade 3 or the beginning of grade 4. In the upper grades an incensive touch typing program should be provided with the emphasis placed on incorporating this skill into other subject areas. Tape-recorded typing programs and necessary equipment to support such programs are available from the M.R.C. The teacher responsible for the visually impaired student's typing program should discuss with the resource person modified programs, techniques and possible problems in this skill development area.

NOTE: It is recommended that a braille-using student always use a carbon when typing in order that he has a copy should the ribbon be worn or not in the machine.

Teachers of Typing 10, 20 and 30 should consult itinerant teachers to discuss modifications which may be necessary for visually impaired students.

f. Orientation and Mobility

Orientation and mobility are the skills associated with travelling safely and independently from one point in the environment to another. Considerable training in use of the senses and the various travel aids such as the white cane are essential to the development of good travel skills. Funding is available to provide this type of training for blind students. Teachers should contact an itinerant teacher or a consultant for the visually impaired.

7. Use of Media and Aids

The curriculum guide for the visually impaired includes specific teaching strategies for the educational objectives which are unique to visually impaired students. The regular classroom teacher is advised to contact the itinerant teacher or Alberta Education Consultant for the Visually Impaired regarding further strategies or modifications which would be appropriate for a particular student. The teaching suggestions which follow are helpful to visually impaired students and require a minimal amount of teacher planning time. Their inclusion in a lesson may also enhance the learning environment for all students.

a. Chalkboard Use.

For the partially sighted student, the teacher should

- read aloud what is being written on the chalkboard
- keep chalkboard clean to allow for good contrast
- avoid using pastel colored chalks
- be alert to glare from the chalkboard
- allow the student to sit wherever he can best see the chalkboard
- allow the student to walk up to the board as necessary.

b. Maps, Diagrams and Models.

Visually impaired students should have a learning experience with the "real thing" whenever possible. When models are used, these should contain only essential details, be easily discernible tactually for braille users and have clear color contrast for partially sighted students. Complicated information such as is found on a weather map might be simplified for visually impaired students by having portions of the information placed on two or three separate raised line or large print maps.

c. Films, Television and Slide Tape Presentations.

Visually impaired students enjoy audio visual materials as do their sighted peers. The partially sighted student should be in the best position to see the screen. The student is often his own best judge as to location. Arrangements may be made to have a buddy preview the film with the student, or a description of it may be read to the blind student prior to the viewing of it in class. During the class viewing a sighted buddy should be nearby in order that explanation of the action may be provided as necessary. During the follow-up, there should be time for discussion with the student to ensure that the primary objectives of the audio visual presentation were understood.

d. Overhead Projector.

It is recommended that teachers read aloud what is being written on the overhead. Consideration should be given to using a sighted buddy or providing the student with a copy of the material in print, braille or sound recording format. It may be advantageous for the partially sighted student to look at the illuminated transparency on the overhead rather than the projected image on the screen.

8. Physical Education, Fine and Practical Arts

The visually impaired student should not be excluded on the basis of his disability from physical education, art, music, drama, home economics, or industrial education. Through participation he will develop his capabilities and learn to recognize and accept his limitations. The visually impaired student may not be able to participate in every aspect of these programs but the creative teacher will include the student in most class activities through planning, the use of various teaching techniques, and the use of special equipment.

a. Physical Education

Most of the objectives, developmental skills and activities within the regular physical education program are appropriate for visually impaired students. The elementary program which emphasizes body mastery activities, dance and rhythm and general fitness is particularly valuable and may be integrated easily with many of the skills necessary for orientation and mobility.

When planning a program in physical education at the junior and senior high school level, priority should be given to developing skills and activities which the visually impaired student can continue to enjoy as a fitness and leisure activity once he has completed formal schooling. Roller skating, gymnastics, dance, swimming, cross-country skiing, snow-shoeing, yoga, judo and wrestling are examples of activities which require little or no degree of modification. Games that include a fast moving object generally require significant alterations in order to include the visually impaired student. However, with careful planning and the use of auditory goal locating devices and sound emitting equipment, appropriate adaptions can often be made, e.g. hockey with a sound emitting device.

In games which involve high speed projectiles, safety precautions may be necessary for students lacking in near or central vision or having tunnel vision. However, modifications such as wearing a face mask or being the official score keeper assure the student is still actively involved.

Goal ball, a game developed for blind athletes, may also be played with sighted students using eye shades. Such an activity often is helpful in developing an appreciation and respect on the part of sighted peers regarding the blind student's capabilties.

Should there occasionally be a certain class activity which the visually impaired student cannot participate in, provisions should be made to have him participate in other appropriate skill activities with a buddy or small group.

Blind students frequently become avid sports fans; they attend many spectator games and rely upon a radio for information on the progress of play. Attention should be given to familiarizing them with the objectives of the game, rules of play, player positions, and the playing field's shape and dimension. Commercial tactile aids are available to assist in this instruction.

b. Music

Participation in, and enjoyment of music can be very rewarding for students who are visually impaired. Braille music (a separate braille code) can be obtained through the M.R.C. Since blind students who understand braille music notation memorize their music, the braille transcription must be ordered well in advance of when it is required for a music class. A cassette tape recording which could be produced at the school, would assist students in

learning new music material. For the partially sighted large print music staffs are available from the M.R.C. Volunteers, other students and parents, can assist in transcribing music notation to these large print staffs by using black felt pens. Consideration should be given to the use of a music stand to bring the large print notation closer to the student.

Rhythm based activities and music based on the Carl Orff system are particularly good for young visually impaired students. Participation in school musicals, Christmas concerts and operettas are all possible and valuable. Teachers may wish to include the music of well known blind musicians and, where possible, arrange for demonstrations by local blind musicians in their music appreciation programs. Also, teachers may find it valuable to contact instructors who give private music lessons to visually impaired students.

c. Drama

Participation in school drama activities is valuable to visually impaired students. Tactile tape strips on the floor of the stage and sound cues can be used to assist blind students in learning to move about on stage.

d. Art

Appreciation of, and participation in many art forms does not require vision. Sculpture and ceramics provide excellent opportunities for creative expression. There are several publications available which could assist art teachers in their work with visually impaired students.

e. Home Economics and Industrial Education

As adults visually impaired students will need to be able to cook for themselves, keep their homes or apartments tidy and make minor repairs to clothing. They will also need to be able to care for furniture, unclog drains, work on rumpus rooms, and make minor electrical repairs and all of the things that sighted people need to do to care for themselves and their dwellings. Therefore, practical arts activities are as necessary for visually impaired students as for the rest of the student body. Itinerant teachers and consultants for the visually impaired can provide materials and teaching suggestions to assist practical arts teachers.

F. ASSESSMENT AND EVALUATION

1. Assessment

A comprehensive report from the professionals who have been involved with the visually impaired student will assist the receiving teacher to plan for individualizing the student's program, and involving the student's family in the program. Therefore, this report to the teacher should contain the following:

a. visual functioning, including recommendations for visual aids
b. specific information on most recent assessments and program needs in language, cognition, motor coordination, socialization and self help skills
c. information on student's learning style, attention span, behavior, response to certain management techniques and preferral rewards
d. recommendations relative to behavior management and instructional strategies
e. relevant medical information, e.g. current medication, any restriction of activity, other problems besides eye condition
f. significant previous events, e.g. hospitalization
g. relationships within the family, including ages of siblings.

2. Evaluation

Visually impaired students should be made aware of the established criteria for evaluation and any particular adaptations which will apply to them. They should feel that the evaluation of their achievement has been "fair and just" and that it has been based on the same criteria as for other students. All students should know that they have earned their marks and credits.

Evaluation is an ongoing process based on established criteria which, for any subject area, involves consideration of a variety of components such as class participation, reports, assignments, quality of notebooks, quizzes, tests, projects and examinations. Discussion of several of these components, including suggestions for checking a braille notebook, may be found throughout this section. Teachers should discuss the evaluation criteria with the resource person for the visually impaired student early in the school year in order that they may become aware of any modifications or techniques which will facilitate the application of the evaluation criteria to the visually impaired student. They should also discuss the criteria with the student.

Tests and Examinations

There are a variety of methods which may be used to equalize the opportunities for handicapped students in test and examination situations. These methods will involve time adjustments, supervision and attention to examination security and may range from the use of a reader-scribe to the use of a specially prepared braille examination.

The examination should be administered on an individual basis with a supervisor available to act as a reader-scribe for the visually impaired student upon request by the student.

Visually impaired students will read at slower rates than other students. Even when provided with a reader/scribe the oral reading involved will be much more time consuming than the silent reading of sighted students. Print reading speeds, even with the use of magnification devices, range from 25 to 150 words per minute depending on the individual's handicap, while braille

reading speeds may range from 50 to 100 words per minute depending on the student's proficiency. Students using tape recorded tests will not likely exceed 130 words per minute and will be further slowed if they must stop, locate, and listen again as would be the case in multiple choice questions or where there are several questions relating to a particular prose section.

Sufficient time should be provided for the student to complete the examination. Each sitting should not exceed two hours with a maximum of two sittings per day allowing for additional time for the next day if necessary. This time may be reduced for elementary age students or students exhibiting fatigue.

The visually impaired student will tire easily; double sittings might be considered if supervision can be provided and test security maintained. Consideration should also be given to providing the visually impaired student with an opportunity for an overview of the examination and the marking system in order that the student, knowing his strengths and weaknesses, may be able to determine where to begin and how to apportion his time.

Consideration should be given to careful selection of questions from tests and the prorating of marks for visually impaired students in order to obtain a valid measure of their achievement, while avoiding undue frustration and fatigue for them and the necessity of the teacher having to arrange time extensions. Only those items on the achievement tests which relate directly to the material covered should be administered to the visually impaired student.

Visually impaired students will generally be unable to skim materials and will experience considerable difficulty in completing multiple choice or matching questions. When multiple choice questions are unavoidable, braille or large print answer sheets available from the M.R.C. should be used.

Achievement tests and comprehensive examinations are provided for students in certain grades by Alberta Education. The following should be considered:

a. Achievement tests should be administered to visually impaired students only after the material has been covered. For example, a visually impaired student in his third year of school may not be ready to write the grade three achievement tests.

   Since modifications to the test and testing procedures will be necessary the results should not be included in the norms for the province.

b. Visually impaired students should be eligible to take the comprehensive examinations. These tests provide valuable information to the student, parents, post-secondary institutions and future employers. The results of these examinations should not be included in the provincial norms.

c. All requests for modifications, e.g. brailling examinations, time extensions, etc., for provincially administered examinations must be made to the: Secretary, Special Cases Committee, Alberta Education,

Devonian Building, West Tower, 11160 Jasper Avenue, Edmonton, Alberta, T5K 0L2. These requests must be made well in advance (approximately two months) to allow time for examinations to be prepared.

A letter referring a student to the committee should indicate the handicap which necessitates special provisions, the provisions the school proposes to make and any special requests, for example, that the examination be brailled. After the examination has been written, another letter, indicating the disability and the actual conditions of writing should be sent to the Special Cases Committee. A copy of that letter should also be stapled to the student's exam envelope, being returned with the other student examinations for marking, to ensure that this student will be properly credited.

RESOURCES:

Barraga, Natalie. Assessment and Evaluation of Individual Functioning. Visual Handicaps and Learning, A Developmental Approach. Wadsworth Publishing, 1976.

Swallow, Rose-Marie. Fifty Assessment Instruments Commonly Used with Blind and Partially Seeing Students. Journal of Visual Impairment and Blindness, February 1981, pp 65-72.

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APPENDIX A

USEFUL TERMS

LEGAL BLINDNESS - Central visual acuity of 6/60m or less in the better eye after correction or central visual acuity of more than 6/60m if there is a field defect in which the peripheral field has contracted to such an extent that the widest diameter of visual field subtends an angular distance no greater than 20 degrees.

MOBILITY - The actual locomotion of the individual from his present fixed position to his desired position in another part of the environment. Mobility includes all of the motor skills.

OPTHALMOLOGIST - A physician (M.D.) who specializes in diagnosis and treatment of defects and diseases of the eye, and who performs surgery when necessary or prescribes other types of treatment, including glasses.

OPTICIAN - The person who grinds lenses, fits them into frames and adjusts the frames to the wearer.

OPTOMETRIST - A licensed non-medical practitioner, who measures refractive errors -- the irregularities in the size or shape of the eyeball or surface of the cornea -- and eye muscle imbalances. In his treatment he uses glasses, prisms and exercises only.

ORIENTATION - The process of utilizing the remaining senses in establishing one's position and relationship to all other significant objects in the environment.

VISUAL ACUITY - A clinical measurement of the ability to discriminate clearly the fine details of objects or symbols at a specified distance. 6/6 means that a child sees at 6 meters what is normally seen at 6 meters. 6/60 means that a child sees at 6 meters what is normally seen at 60 meters. Acuity figures can be equated with print size for near vision.

APPENDIX B

BRAILLE

The braille system of raised dots is based on a six-dot cell which contains two vertical rows of three dots. It is possible to describe a particular braille symbol by naming the dots according to number beginning with number 1 on the top left and concluding with number 6 at the bottom right, e.g. "1, 4, 5" describes the location of the dots which represent the letter "d". The student will understand such a description and be able to respond, but the preferred method during the student's instruction in braille would be to refer to the position of the dots. Instead of dots 1, 4, and 5, the student and instructor would use top/left, top/right and middle/right.

There are 63 possible combinations in braille. Many of these combinations have multiple uses in reading and brailling/writing. For example, the space on one cell which contains two dots in a horizontal position has numerous possible meanings depending upon context and the position of the dots at the top, middle or bottom of the cell. This configuration could represent a letter, a whole word, a portion of a word, one of three possible punctuation marks, or it might indicate that the following title is in capital letters. To interpret the symbol the student must first recognize that the configuration consists of two dots in a horizontal position. Secondly, he must determine whether they are located at the top, middle or bottom of the cell by checking their position against the levels of dots in the preceding or following configurations. Finally, he must check his perception of the meaning of the configuration against the context to feel confident of the interpretation. The first two steps soon become automatic. The tactual discrimination involved is fine since the distance from the center of one dot to the center of the next is only 2.3 millimeters.

In working with a braille-using student it is useful to know that:

1. Alberta Education accepts the American National Braille Association standard of braille production. Students use standard grade 2 braille which is not letter for letter with print but rather a uniformly contracted code designed to speed the reading and brailling processes as well as to save space and reduce the bulkiness of brailled materials.

2. Contracted braille, with its partial words and letter symbols which represent whole words, assists the student to read and braille more rapidly but it also causes some difficulties for him. Spelling can be a problem. For example, the letter "k" and the word "knowledge" are both represented by one configuration of raised dots. The student uses this symbol when brailling the word knowledge and this symbol is all he feels when reading the word. If he spells "knowledge" aloud or if he types the word he must remember to use all nine letters k-n-o-w-l-e-d-g-e. Also, at times contractions interfere with syllabication, e.g. nation in braille involves two configurations, one for "n" and the other for "ation".

3. Despite the use of contractions brailled material is very bulky. A dictionary or a biology text book may extend to 12 - 20 volumes. Therefore, the braille-using student needs advance notice of print page numbers, in order that he can have the appropriate volume of his brailled book available for use in class.

   Braille text books contain both braille page numbers and the corresponding print book page numbers. This enables the student to supply the teacher with the print page number when wishing to discuss a particular passage and it also enables him to locate the appropriate volume and braille pages from the print page numbers indicated by the teacher.

4. Canadian books and Canadian versions of American text books are generally not available for purchase and therefore they are hand transcribed locally. The format of the braille book will be essentially the same as the print book with the addition of explanatory notes by the transcriber.

5. The teacher should have information about the general ability, achievement level, reading speed and comprehension of the braille-using student. A resource person should be contacted if such information is not available as it has definite implications for instruction. Knowledge that a braille-using student has good average ability, is functioning at grade level, types at 35 words per minute, has good comprehension of brailled materials at reading speeds of 70-115 words per minute (depending whether the material is narrative or content in nature), is important information for the teacher. It indicates that provisions will have to be made to assist this capable student to keep up with his classmates. To accomplish this, reductions in reading assignments, increased time allowances, use of tape recorded materials and other adaptations may all be required.

6. There are basic similarities between reading print and reading braille. However, there are differences between the two modalities in the actual process of learning to read.

   Print reading books, particularly in the early grades, make use of colors, pictures and varied formats to increase motivation and to augment the literary content. For the blind student, who does not have access to these, the content is often quite sterile and lacking in motivational devices. Print readers frequently make reference to visual concepts which are beyond the ability of the blind student to experience. References to colors, stars, clouds and fairies may be easily understood by sighted students as a result of their experience and through use of illustrations. Initially these words are meaningless to the blind child and may only cause frustration and add to his

tendency to use words without any real concept of their meaning. Print users use words with letter combinations from a 26 letter alphabet. If they are using transcribed readers braille users, with 63 possible combinations and multiple uses for many of these, may be exposed to reading braille contractions which are extremely difficult or which receive little or no reinforcement in the primary grades. The resulting confusion interferes with their learning. Learning of braille under these circumstances is not appropriately sequenced from easy to difficult nor does the student receive adequate reinforcement of new learning.

There are a few good reference books dealing with instruction in braille reading available for teachers. Also, the American Printing House for the Blind (A.P.H.) is currently developing and field testing the first reading series specifically designed for the instruction of braille-using students.

APPENDIX C

SPECIAL MATERIALS AND EQUIPMENT

LARGE PRINT BOOKS - The size of the print varies from one large print book to another. Books are only printed in black and white, therefore, there are no color illustrations. These books are also bigger than regular print books.

BRAILLE TEXTS - A braille transcription of a regular textbook frequently is 10 or more volumes. Each volume is large and bulky.

SOUND RECORDINGS - Many of the texts, particularly at the junior and senior high school levels, in the language arts and social science subject areas, are available on cassette sound recordings. Because visually impaired students must rely on their auditory sense to a great degree, it is suggested that emphasis be placed on a listening skills program, particularly at the elementary level (see Communication section).

Taped text books have some limitations. It is difficult to skim tape recorded material as one would skim print when searching for a specific piece of information. A taped book will either omit reference to the pictures, diagrams or other illustrations found in the print copy or attempt to verbally describe this visual information. Some teacher assistance may be necessary in order that the student has access to important information. Tape recordings are inappropriate for physics, chemistry and mathematics books.

Partially sighted students and their teachers should always have access to the print copies of taped books for additional reference and clarification.

The cassette recorder/player has tactually marked keys and a variable speed control mechanism. The recorder may be used with attachments such as ear phones or a foot pedal switch.

TYPEWRITER - Most visually impaired students should know how to type by the end of elementary school. See E. Meeting Educational Needs, 6. Special Skill Development, typing section (page 14).

Advantages for partially sighted students in becoming proficient typists are comfort, speed and increased legibility. Partially sighted students may use a typewriter in combination with a cassette recorder, large print book or closed circuit television magnifying system.

For the braille-user the typewriter is the only efficient method of directly communicating in a written form with a non-braille reader. Since regular class teachers are not expected to know braille the blind student will use the typewriter for all assignments submitted to the teacher. Braille-users may use the typewriter in combination with braille books, brailler, cassette recorders and possible an optacon.

BRAILLER OR BRAILLE-WRITER - All braille-using students will require a brailler for school use and another at home. The brailler will be used as a personal writing device for almost all information the student needs to record in all subject areas. It is also used for mathematics. The brailler is a sturdy machine, weighing about 3½ kilograms and is transportable from classroom to classroom. Students may use it in combination with braille books, a typewriter, cassette recorder or a talkout calculator.

CLOSED CIRCUIT TELEVISION SYSTEMS - The closed circuit television system is especially modified to provide various degrees of magnification. Reading material is placed under the lens, and the screen displays an illuminated magnified positive or negative image of the material. Some partially sighted students can benefit greatly from using this reading aid. Usually their reading rate with the aid will be slow but it enables them to read material from any print book. A teacher or consultant for the visually impaired should be consulted regarding the appropriateness of this aid for individual students.

OPTACON - The optacon is a portable reading aid for the blind. It converts the printed letter into a tactile image that can be felt with one finger. Extensive training and practice is necessary to develop proficiency in reading using the optacon and even with a great deal of experience a good optacon reader will read only at a relatively slow rate. Still the optacon facilitates a greater degree of independence as it provides access to many reading materials which would otherwise be unavailable. Students may, for example, find it helpful in proof reading typed assignments, in reading personal mail, short excerpts from texts, articles from journals, and in using the index cards in the library.

DICTIONARIES, ATLASES, AND ENCYCLOPEDIAS - Visually impaired students should have large print or braille atlases and dictionaries best suited to their requirements. These are available from the M.R.C.

Blind students will not have access to a braille encyclopedia and will need to have necessary passages read to them. Partially sighted students may use magnifying aids such as hand held magnifiers or a closed circuit television reading system when using a regular print encyclopedia.

MATH AIDS:

ABACUS - A manual computational device, used in mathematics. Blind students begin using an abacus in the primary grades.

SPEECH-PLUS CALCULATOR - The Speech-plus calculator is an electronic talking calculator used primarily by students in the junior high and high school grades. It can be helpful as either a calculating or self-checking device.

APPENDIX D

IMPLICATIONS OF DIFFERENT VISUAL CONDITIONS

In determining the implications for education which result from a student's impaired vision teachers should consider the student's actual ability to function with his limited vision, his near and distance visual acuity and the type of impairment caused by his particular condition or conditions.

1. This picture represents a street scene as viewed by someone with normal vision. The other pictures which simulate impaired vision present the same street scene as it might appear to students with the particular eye conditions indicated.

2. Macular degeneration: note the central scotoma or blind spot. This student would have little difficulty in moving about in his environment but he would experience some difficulty in reading from the chalkboard and from books.

3. Glaucoma: this condition, involving increasing pressure within the eye, requires monitoring by an eye specialist or opthalmologist. The student will likely be on medication and may experience pain. Peripheral (side or travelling) vision is reduced, hence, travelling will be difficult as will viewing back and forth from chalkboard to notebook.

4. Cataract: opacity or cloudiness of the lens or lenses of the eye reduces visual acuity or clarity resulting in an overall haziness. Vision may be even less distinct if the student is hampered by glaring light. This has implications for both near and distance activities in the classroom.

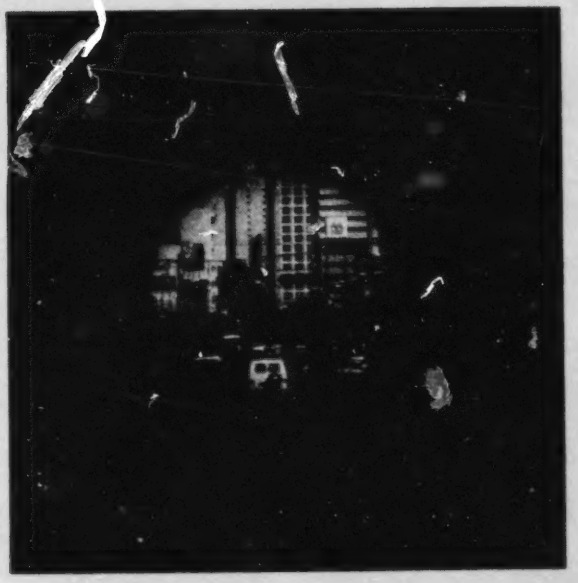
5 & 6. Hemianopia: this condition is a result of a defect in the optic pathway between the eye and the brain. Half of the field of vision may be lost. Loss of the right half, resulting in reading problems, is the most common. However, this condition can affect left, lower or upper visual fields. Travel difficulties would also result if lower half is affected.

6. Hemianopia (additional illustration)

7. Retinal Detachment: a hole or tear in the retina can allow fluid to lift a part of the retina from its normal position. This causes the person affected to see a dark shadow obstructing part of the visual field.

8. Corneal Pathology: when the cornea or clear surface of the eye is damaged the image becomes distorted and unclear, somewhat like the distortion we experience if we were to view a scene through a poorly made and dirty window. Corneal problems have implications for reading and for safety in travel.

9. Retinitis Pigmentosa: a progressive condition resulting in ever narrowing tunnel vision. Travel is difficult as is working from chalkboard to notebook.



APPENDIX E

References

Reference books, some films and other materials in each area of exceptionality are available on a loan basis from the Edmonton and Calgary Regional Offices of Education. The following titles represent a selection from these sources. Titles indicated are not exclusive to the categories.

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Hardman, Michael et al. What Will We Do in the Morning? Dubuque, Iowa: Wm. C. Brown Co. Pub., 1981.

Harley, Randall K. The Teaching of Braille Reading. Springfield, Ill.: Charles C. Thomas Publishers, 1979.

Lowenfeld, Berthold ed. The Visually Handicapped Child in the Regular Classroom. Scranton, PA: The John Day Co., 1973.

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Webster, Richard. The Road to Freedom. Jacksonville, Ill., Katan Publications, 1978.

FOR USE WITH PARENTS OF YOUNG BLIND CHILDREN:

Baker B. Speech and Language Levels I and II. Steps to Independence: a skill training series for children with special needs. Champaign: Ill., 1978.

Brazelton, T. Berry. Infants and Mothers. New York, NY: Delacourte Press, 1975.

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Davidson, Ian. A Handbook for Parents of Preschool Blind Children. Ontario: Ministry of Education, 1976.
Drouillard, Richard. Move It. Washington, DC: AAHPER Publishers, 1977.
Fraiberg, Selma. The Magic Years. New York, NY: Charles Scribner's Sons, 1968.
Hart, Verna. Beginning With the Handicapped. Springfield, Ill.: Charles C. Thomas, 1974.
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McDonald, Eugene T. Understanding Those Feeling. Pittsburgh, PA: Stanwix, 1962.
Raynor, Sherry. Get A Wiggle On. Washington DC: Ingham Intermediate School District, 1975.
Webster, Richard. The Road to Freedom. Jacksonville, Ill.: Katan Publications, 1978.

FOR USE WITH STUDENTS IN REGULAR CLASSES:

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Corn, Ann. Monocular Mac. New York, NY: National Association for Visually Handicapped, 1977.
Litchfield, Ada B. A Cane in Her Hand. Chicago, Ill.: George J. McLeod Ltd., 1977.
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